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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,004	01/20/2004	Tai-Chun Huang	TS03-484	1655

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HAYNES AND BOONE, LLP
901 MAIN STREET, SUITE 3100
DALLAS, TX 75202

EXAMINER	
DANG, TRUNG Q	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/761,004	HUANG ET AL.	
	Examiner	Art Unit	
	Trung Dang	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *03/19/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1, 2 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Cole (US 6,705,925).

The reference teaches a method to singulate a circuit die from an integrated circuit wafer comprising:

providing an integrated circuit wafer containing a circuit die having non-rectangular, irregular shape (Fig. 5 and col. 3, lines 1-3);

cutting through said integrated circuit wafer by using water jet cutting system, the die cutting operation is performed using coordinates that are calculated and programmed into the cutting system computer (Figs. 4, 8 and col. 6, lines 8-30; col. 7, lines 31-58). Note that, since the cutting operation uses a set of pre-calculated data fed from the computer (Fig. 4), the cutting is a single and continuous process as claimed. Also see die 102 in Fig. 1C that is precisely cut around the perimeter of the die.

3. Claim 19 is rejected under 35 U.S.C. 102(b) as being anticipated by Sliwa, Jr. (US 5,075,253).

With reference to Figs. 3a and 3b, the prior art teaches a method to singulated a circuit die from an integrated circuit wafer comprising the steps of:

providing an integrated circuit wafer containing a circuit die;

cutting through said integrated circuit wafer on a first part of the perimeter of said circuit die using reactive ion etching (RIE) or laser etching (Fig. 3a and col. 10, lines 1-10);

cutting through said integrated circuit wafer on a second part of the perimeter of said circuit die using a wafer-sawing step (Fig. 3b and col. 10, lines 16-18), thereby singulate said circuit die.

Note that the RIE or laser etching is inherently using a focused beam apparatus, and the wafer-sawing cutting is inherently using a wafer saw blade apparatus.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cole cited above in view of Fu (US 6,713,843).

Cole teaches a singulation method as described above. Cole differs from the claims in not specifically disclosing that the non-rectangular, irregular shaped dice having the shapes as claims.

Fu teaches a wafer contains a plurality of dice in different shapes and sizes (Fig. 5). The arrangement of dice with various shapes in the same wafer increases wafer utilizable area (col. 4, lines 17-34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cole's teaching by fabricating the non-rectangular, irregular shaped dice having the shapes as suggested by Fu because dice having such shapes would have the benefit of increasing wafer utilizable area.

6. Claims 10, 11, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cole as above in view of the admitted prior art.

Cole teaches a singulation method as described above. Cole differs from the claims in not disclosing the mounting of the singulated die to a package and

coupling signal pins of said package to signals in said electronic circuit as claimed.

The admitted prior art of Fig. 4 teaches singulated die 38 is fixably mounted to a package 42 and then coupling signal pins 46 of said package to signals in the die through wire 54.

It would have been obvious to one of ordinary skill in the art to modify Cole's teaching by mounting and wire connecting the singulated die in the manner suggested by the admitted prior art because such practice is widely known in the manufacture of semiconductor chip.

As for the device claim 20, the combined process of Cole and the admitted prior art would result in the structure as claimed.

7. Claims 12-16, 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cole taken with the admitted prior art as applied to claims 10, 11, 18 and 20 above, and further in view of Fu cited above.

The combined process of Cole and the admitted prior art teaches a method a noted above. The combination differs from the claims in not disclosing that the non-rectangular, irregular shaped dice having the shapes as claims.

Fu teaches a wafer contains a plurality of dice in different shapes and sizes (Fig. 5). The arrangement of dice with various shapes in the same wafer increases wafer utilizable area (col. 4, lines 17-34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teaching of the combined process by fabricating the non-rectangular, irregular shaped dice having the shapes as suggested by Fu because dice having such shapes would have the benefit of increasing wafer

utilizable area.

As for device claims 21-25, the combination of three references described above would result in the structure as claimed.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cole as above in view of Takiar (US 2004/0259291).

Cole teaches a singulation method as described above. Cole differs from the claims in not disclosing that the non-rectangular, irregular shaped die is cut using a laser.

Takiar teaches cutting non-rectangular shaped die from a wafer using either water jet or laser (para. [0043]).

It would have been obvious to one of ordinary skill in the art to modify Cole's teaching by employing a laser to singulate the non-rectangular die as suggested by Takiar because the substitution of art recognized alternatives to make the same would have been within the level of one skilled in the art, absent a showing of criticality or unexpected result by applicants.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cole taken with the admitted prior art as applied to claims 10, 11, 18 and 20 above, and further in view of Takiar cited above.

The combined process of Cole and the admitted prior art teaches a method a noted above. The combination differs from the claims in not disclosing that the non-rectangular, irregular shaped die is cut using a laser.

Takiar teaches cutting non-rectangular shaped die from a wafer using either water jet or laser (para. [0043]).

It would have been obvious to one of ordinary skill in the art to modify the combined process of Cole and the admitted prior art by employing a laser to singulate the non-rectangular die as suggested by Takiar because the substitution of art recognized alternatives to make the same would have been within the level of one skilled in the art, absent a showing of criticality or unexpected result by applicants.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Dang whose telephone number is 571-272-1857. The examiner can normally be reached on Mon-Friday 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-

direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Trung Dang
Primary Examiner
Art Unit 2823

04/02/05